Foreign rectal body - Systematic review and meta-analysis

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Abstract: Background: Self-inserted foreign rectal bodies are an infrequent occurrence, however they present a serious dilemma to the surgeon, due to the variety of objects, and the difficulty of extraction. The purpose of this study is to give a comprehensive review of the literature regarding the epidemiology, diagnostic tools and therapeutic approaches of foreign rectal body insertion. Methods: A comprehensive systematic literature review on Pubmed/ Medline and Google for 'foreign bodies' was performed on January 14th 2018. A meta-analysis was carried out to evaluate the epidemiology, diagnostics and therapeutic techniques. 1,551 abstracts were identified, of which 54 articles were included. Results: The motivation of foreign rectal body insertion is mostly sexual stimulation. Patients are typically young and predominantly male, with a male to female ratio of 6:1. Sexual devices (35.7%, n=108) and glass objects (17.5%, n=53) are the most commonly self-inserted rectal foreign bodies. Patient history should be taken sensitively after diagnostic evaluation and identification of the object. Removal was performed under general anesthesia in 45.2% (n=95) and sedation in 29.0% (n=61). The total complication rate was described to be 30.4%. Conclusions: Diagnostics must be performed with caution in order to rule out perforation and establish a treatment algorithm. Manual transanal extraction under sedation or general anesthesia may be performed in conjunction with cautious abdominal compression. Because of the variety of objects, i.e. in form and material, each case must be treated individually. Sometimes creativity and surgeon imagination may be required, although different algorithms have been established.

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Conclusions : **Diagnostics must be performed with caution in order to rule out perforation and establish a treatment algorithm. Manual transanal extraction under sedation or general anesthesia may be performed in conjunction with cautious abdominal compression. Because of the variety of objects, i.e. in form and material, each case must be treated individually. Sometimes creativity and surgeon imagination may be required, although different algorithms have been established.** (Acta gastroenterol. belg., **2020**, 83, **61-65**).

Key Words : acute abdominal pain, foreign body, rectum, diagnosis, extraction, surgical treatment.

Introduction

Injuries of the descending colon, including the rectum and anus, are important causes of morbidity and death (1). A foreign body presents a serious dilemma to the emergency physician and surgeon due to the variety of objects that can be introduced into the rectum (2). Foreign rectal bodies have been an infrequent case in the past, but they have become more common in recent years (3,4). The annual incidence is described to be 0.15 per 100,000 people (5), however, the exact incidence of self-inserted foreign bodies is not known, as patients only present to the emergency room when self-removal is impossible, or suffer from acute abdominal pain (6).

Sexual devices and glass objects are most commonly found in males, even though most patients do not give precise history. There are many ways that foreign bodies can be introduced to the rectum, including diagnostic or therapeutic instrumentation, ingestion, erosion or entrance from adjacent tissues, assault or injury and auto-erotic instrumentation (7). The most common complication is a rectal injury, which can result from a variety of agents and objects (8). Often, nonsurgical removal of foreign bodies has been described to be successful – in 11% to 65% – (9), however, in many situations, a surgical treatment may be essential. There have been a variety of algorithms introduced for the management of extraction, however, because of the diversity of foreign bodies, improvisation, as well creativity of the treating emergency physician and surgeon, may be required (3,10,11).

We performed a systematic literature search and meta-analysis on foreign bodies to give a comprehensive overview on the epidemiology, diagnostic tools and therapeutic approaches.

Methods

A systematic literature search was performed by two of the authors (MP and HCB) using the Medline database, Pubmed and Google on January 14th, 2018. Search terms included 'colon' OR 'colorectal' OR 'rectal' AND 'foreign body'. Articles in English, German, Italian and French were included, which reported the demographics, diagnostics, and therapeutic approaches to extracting the foreign bodies. Exclusion criteria included duplicate results, cases not involving foreign bodies, letters to the editors and comments. In total, 1,551 studies were found based on our search terms between 1939 and 2018. 1497 articles had to be excluded, as they did not meet inclusion criteria, leaving 54 articles to be included for the literature review (table 1). All calculations and tables were performed with Microsoft Excel, SPSS and Origin Lab, using the t-test.

Results

Epidemiology

In 1939, Smith described the first case of foreign body insertion (12). Since then many cases have been reported, however, to our knowledge, no meta-analysis has been performed so far. Most patients indicated that

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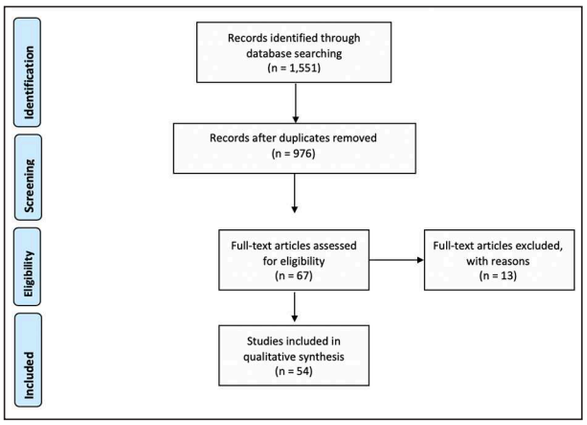
they inserted the foreign body for sexual stimulation (2), (7) (table 2), however, the psychology of the act of rectal instrumentation for sexual stimulation is rarely observed (7,13,14). It is predominantly males that present with this issue, with a male to female ratio of 6 to 1, and an age range from 11 to 80 years. In most cases the bodies were self-inserted, and less frequently by their partners – either female or male (2,15,16), (table 3). When looking for the patients sexual orientations (heterosexual, bisexual and homosexual patients), only a few articles exist which showed an equal distribution (1,17).

The most common inserted foreign rectal bodies after sexual devices are glass objects. These represent one of the most complicated bodies, because of their smooth surface, size, shape and fragility (table 4). Before patients consult a medical doctor, they try many approaches to extract the object (18,19) and may wait even up to 5 years before presenting to the hospital. (20) Once they present to the emergency department, they are often not forthcoming with the etiology of their complaint (2) and describe more general symptoms, such as abdominal or rectal pain, rectal bleeding, and constipation.

Table 1. — **Prisma Flow Diagram**



Diagnosis

Although, patients may be embarrassed, their medical history is essential for documentation and should be recorded sensitively. Physical examination should include a careful abdominal examination to assess

Table 2. — **Reported circumstances of insertion**

	N	Percentage	References
Sexual stimulation	172	35.8 %	Busch (1), Cohen (2), Ayantunde (3), Biryukov (7), Kouraklis (28), Yaman (30), Falco (39), Rocklin (15), Ruiz de Castillo (16), Subbotin (40)
Assault	25	5.2 %	
Associated with alcohol	5	1.0 %	
Smuggling	3	0.6 %	
Amateur self-medical treatment	22	0.5 %	
Remedy for constipation	2	0.4 %	
Fell on object	8	0.2 %	
Other or not reported	243	50.6 %	
Total	480	100 %	

Table 3. — **Gender and age described by literature.**
The patients are typically young to middle-aged adults with a male to female ratio of 6:1

Gender			Age			
	n	Percentage		n	Percentage	References
Male	899	86.1 %	11-50 years	147	73.1 %	Busch (1) Ayantunde (3), Barone (6), Cawich (5), Grasberger (8), Biryukov (7), Rocklin (15), Johnson (19)
Female	145	13.9 %	51-80 years	54	26.9 %	
Total	1044	100 %		201	100 %	Odagiri (41)

Table 4. — **Inserted objects described by literature**

	n	Percentage	References
Sexual device	108	35.7 %	Busch (1), Cohen (2), Ayantunde (3), Barone (6), Cawich (5), Yaman (30), Falco (39), Rocklin (15), Kurer MA (14), Johnson (19), Fabian (42), Kleitsch (43), Norberg (21), Nolan (44), Rodriguey-Hermosa (37)
Glass bottle	53	17.5 %	
Food	34	11.2 %	
Wooden objects	23	7.6 %	
Glass or cup	21	6.9 %	
Deodorant bottle	12	3.9 %	
Toothbrush	6	2.0 %	
Thermometer	2	0.7 %	
Others, like plastic bottle, candle, bone, curtain rod, christmas bulb, umbrella, radio vacuum tube, complete tool bag etc.	44	14.5 %	
Total	303	100 %	

Figure 1. — Plain abdominal film showing the 12 x 6 cm sugar bottle within the small pelvis.

signs of peritonitis or the ability to palpate an object trans-abdominally. This also includes auscultation, as a powered electrical device (such as vibrator) may be identified. The most important examination is the rectal digital examination, which gives information about the presence and location of a foreign body and associated injuries. These may include incarceration, laceration, tear and abrasion of the sphincter, anus or rectum. Before attempting a removal, abdominal radiography in two planes and/ or CT scan is essential in order to determine not only the presence, shape, size and location of a foreign body, but also to exclude perforation (5,21). Figure 1 illustrates such plain radiography after sugar bottle insertion in the rectum. If perforation has occurred, pneumoperitoneum may be visible, indicated by air under the diaphragm (Table 4).

Discussion

Treatment options

After anamnesis and diagnostics, especially in glass objects, special care must be taken to avoid breaking the object and cutting the bowel mucosa or anal sphincter. Manipulation of the rectum may cause the mucosa to become edematous, leading to sphincter spasms and bowel atony, limiting further manipulation and attempts of extraction. Furthermore, the object can lead to anteflexion of the rectum or intrarectal suction effect may result (especially in glasses or bottles) making extraction impossible.

If the foreign body is of small diameter and a suction effect is not present, fleet enema or oral cathartics (magnesium sulfate) may be used, however, risks include hemorrhage, further impaction of the body and bowel perforation (15,22). Occasionally, the object may be too high in the recto-sigmoid to be grasped. For these cases, Barone et al recommends sedating the patient and place them in bed to allow for peristalsis to descend the foreign body within 12 hours (6).

When the object is located in the recto-sigmoideal transition zone, it is recommended to sedate the patient mildly and place them in the lithotomy position (6,23). Hereby, extraction can be attempted only after adequate sedation, and the sphincter should be dilated digitally with caution. Sometimes local anesthetic agents may be used to relax the anal sphincter. A variety of techniques have been described for body extraction however, in order to prevent complications, a spinal or general anesthesia should be considered for manual transanal procedures, with gentle compression to the abdomen (table 5) (11). Further devices like proctoscopy or sigmoidoscopy may be utilized to remove the object under direct vision to minimize the risk of iatrogenic injuries (2,23).

Other helpful devices include forceps, blades or even rubber-lined blades, which have shown to improve traction and reduce the risk of breakage for extraction (23,10). In addition, vaginal spatulas, wire and plastic snakes, uterine vulsellum, rubber-covered bone-holding clamps, rubber-covered tonsils or polyp snare and tenaculum forceps have all been described to grasp foreign bodies for extraction (24,25,26). Hereby intraoperative proctoscopy may be utilized to grasp and withdraw bulky foreign bodies (23,27). However, precautions have to be made to avoid damage to the anal sphincter as mentioned previously (2).

Once a suction effect is identified, a Foley catheter may be passed around the glass object and air may be introduced to interrupt luminal suction and facilitate transanal extraction by gentle traction (28), (29), (30). The same benefit can be obtained by using a Sengstaken-Blakemore-Esophageal tube to extract an incarcerated gals tube of the rectum (31). Objects, with the open end,

Table 5. — **Performed methods of anesthesia**

	n	Percentage	References
General anesthesia	95	45.2 %	Cohen (2), Barone (6), Cawich (5), Grasberger (8), Kouraklis (28), Falco (39), Kurer (14), Johnson (19), Ooi (22), Batho (45), Rodriguey-Hermosa (37)
Local or regional anesthesia	33	15.7 %	
Sedation	61	29.0 %	
No anesthesia	3	1.4 %	
Anesthesia not specified	18	8.6 %	
Total	212	100 %	

Table 6. — **Described complications**

Complications		References
14	Subhepatic abscess, perforation of hernia, hemorrhage, sepsis	Cohen (2), Barone (6), Grasberger (8), Biryukov (7), Falco (39), Rocklin (15), Ruiz de Castillo (16), Kurer (14), Johnson (19), Norberg (21), Ooi (22), Batho (45), Rodriguey-Hermosa (37), Sabetay (46), Pittman (47), Maurage (48), Subbotin (40)
3	Malformation syndrome	
8	Wound abscess, bacteriaemia iatrogenic injuries, abscess, acute renal failure, acute respiratory failure, pneumonia, deep venous thrombosis, fistula, urinary tract infection	
78	Abrasions, lacerations, tears	
103 (30.4%) out of 339 (100%)		

pointing toward the ampulla, like a drinking glass, may be filled with plaster of Paris along with an instrument and/ or a bandage, which can be used as a handle to facilitate extraction once the plaster has hardened (31,32).

Light bulbs are very difficult to extract because of their fragility and size. Hereby, safe removal using fine mesh gauze or cheesecloth, padding the glass bulb, followed by deliberately shattering the object has been described (33). Other ingenious mechanisms to remove light bulbs include a treated broom handle in combination with two large kitchen spoons (34).

After extraction of the foreign body a procto-sigmoidoscopy must be performed to identify both mucosal injuries and perforations (2,6) as plain radiography may only be sensitive to bowel perforation up to 50 % of cases. Furthermore, it is important to avoid contrast material. Once a mucosal injury is identified, anti-tetanus toxoid should be administered as prophylaxis against Clostridium infections (2). In patients who suffer from peritonitis, immediate surgical intervention and administration of antibiotics is required (1,2,23), however this has only been found to be the case in less than 1% of patients (35).

In rectal perforation, primary repair is the method of choice, using laparoscopy or laparotomy with or without a protective ileostomy. In some cases a Hartman Procedure may be required additionally (36,37). Disruptions of the anal sphincter are difficult to manage, and when possible should be repaired primarily (2). Other indications for surgical intervention include acute bleeding, when the foreign body is too fragile and extraction is too risky, it is too large to remove manually, or it is impacted highly under the rectal valves with or without presence of the suctioning effect. A small longitudinal colotomy through the taeni libera should be the method of choice with primarily closure (1,23). Posterior sphincterotomy for removal of particularly large objects has been described (35,38), but should be avoided, since the sphincter mechanism is at least partially destroyed. When looking for postoperative complications, especially wound abscesses, bacteremia, and iatrogenic injuries have been described as shown in table 6.

Conclusion

This comprehensive literature review shows that the incidence of patients presenting with foreign rectal bodies has increased, and it effects both genders, with a predominance in males. After sex toy self-insertion, glass objects are extremely common, which are at high risk for complications. Diagnosis include anamnesis, physical examination and abdominal radiography and/ or CT-scan without contrast material. When attempts at extraction are made, special care must be taken to avoid colorectal and/ or anal injury. Despite the establishment of numerous extraction algorithms, each individual foreign rectal body is unique and treatment may require creativity and imagination to avoid further complications.

Conflict of interest

None of the authors has any conflicts of interest for this study.

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